



PIER Energy System Integration Program Area

CERTS Microgrid Amendment

Contract #: 150-99-003 **Project #:** 3

Contractor: Lawrence Berkeley National Laboratory

Subcontractors: Northern Power Systems

Project Amount: \$1,115,000

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Status: Completed

Project Description:

This amendment is follow-on work initiated in the Real Time System Monitoring and Control area of the existing Consortium for Electricity Reliability Technology Solutions (CERTS) contract 150-99-003. The DER Integration Micro-grid element involved technology development and an approach where the significant potential of smaller DER (<100 kilowatt (kW)/unit) to meet customers' and utilities' needs can be best captured by organizing these resources into Microgrids. Microgrids are envisioned as clusters of generators (including heat recovery), storage, and loads that are operated as single controllable systems. Microgrids can operate both connected to and synchronized with the utility distribution grid and in isolation from the utility distribution grid (as an "island"). System conditions, and more importantly, economic factors will dictate the prevailing mode of operation.

The purpose of this project is to create the technologies and control strategies needed to capture the full potential of distributed energy resources to improve the reliability of the California interconnected power system via the Microgrids concept. The objectives include: consideration of control systems, including the sensors and instruments necessary to gather intelligence for real-time power management and dispatch or coordination among distributed generation resources. It also includes improved modeling techniques to better characterize the technologies and their impacts on the distribution (and ultimately the transmission) system. With correct placement and control, it should be possible to increase system reliability, lower the cost of power deliver, improve power quality, and reduce the environmental impacts of producing and transmitting electricity.

This project supports the PIER Program objectives of:

- Improving the energy cost/value of California's electricity and the reliability, quality and sufficiency of California's electricity by creating the technologies and control strategies needed to capture the full potential of distributed energy resources.
- Improving the environmental, public health, and safety of California's electricity by reducing the environmental impacts of producing and transmitting electricity.

Proposed Outcomes:

1. Improve the energy cost/value of California's electricity by providing a means to automatically respond to supply-side problems.
2. Complete a micro-grid control emulation study and execution of contract with a generator manufacturer.
3. Prepare an RFP to solicit a test facility to evaluate the performances of these controls and related protection.

Actual Outcomes:

1. Completed a micro-grid control emulation study.
2. Prepared an RFP to solicit a test facility to evaluate the performances of these controls and related protection.
3. Evaluated Tecogen's performance to supply a generator (DG) for the micro- grid program.

Project Status:

The project has been completed.

Final Report Title: Planning for California's Future Transmission Grid: Review of Transmission System, Strategic Benefits, Planning Issues, and Policy Recommendations. Please right click on PIER web

location: www.energy.ca.gov/reports/2003-10-23_700-03-009.PDF and
www.energy.ca.gov/pier/final_project_reports/CEC-500-2005-119.html